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NO DRAWINGS

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(54) FRIED POTATO PRODUCTS HAVING IMPROVED FLAVOUR

(71) We, THE PROCTER & GAMBLE COMPANY, a corporation organised under the laws of the State of Ohio, United States of America, of 301 East Sixth Street, Cincinnati, Ohio 45202, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement: —

This invention relates to a process for preparing fried potato products, in particular such potato products prepared from a dough of dehydrated potatoes and water.

The preparation of potato products from a dough based either on raw potato pieces or on dehydrated potatoes is well known. French fried potatoes and potato chips, which are thin, fragile, wafer-like products frequently referred to as potato crisps, are among the potato products which have been prepared from such doughs. The advantages of preparing such products from a dough form rather than from sliced whole potatoes include homogeneity or uniformity in the end products and the ability to more closely control the separate steps involved in the preparation of the product. When products of this type are prepared from doughs based on dehydrated potatoes and water, however, it has been found that the flavour of the resulting fried product, though acceptable, is partially lacking in the characteristic fried potato flavour of corresponding products prepared from raw potatoes. For example, potato chips (which term when used herein includes potato crips) prepared by frying thin slices of raw potatoes generally have a more intense potato chip flavour than potato chips made by frying dough pieces which have been prepared by admixing dehydrated potatoes and water. The reason for these flavour differences appears to be the degradative effect of the dehydration process on the potato cells. Although the precise nature of this degradation is not known, it is theorized that a number of flavour precursors are either destroyed or significantly reduced in availability. Close control over the dehydration process can provide some marginal improvement in ultimate product flavour, but these changes necessarily increase the cost of the dehydrated potatoes by a significant degree and still do not provide, or approach, the flavour of raw potato-based products.

The present invention provides a process for preparing fried potato products with an improved flavour from a dough of dehydrated potatoes and water which comprises:

a) adding to the potatoes from 0.02 to 1.5% by weight of the dough of L-ascorbic acid, dehydro-L-ascorbic acid, D-ascorbic acid, dehydro-D-ascorbic acid, or water-soluble edible salts or mixtures thereof, and

b) frying the dough for 5 to 110 seconds, preferably 5 to 60 seconds, in fat having a temperature of from 275 to 400°F.

Potato products of the present invention having improved flavour obtained by the addition of an ascorbic acid compound prior to frying can be made from a dough based on dehydrated potatoes and water, i.e., a dough prepared by rehydrating dehydrated potatoes. The requirements for preparing such a dough which is suitable for frying are known in the art. Often such doughs utilize a binding agent for cohesiveness. See, for example, British Patent 608,996 which discloses doughs of dehydrated potatoes, water, and a binding agent such as pectin, gelatin or gum arabic. U.S. Patent 3,085,020 discloses doughs of dehydrated cooked mashed potatoes, water, and methyl cellulose. Thus, the flavour improvement concept of the present invention is broadly applicable to doughs based on dehydrated potatoes and water.

Preferably, the doughs utilized in the present invention are prepared from dehydrated potatoes which have a portion of their cells ruptured and thus contain free starch as indicated by an iodine index of from 0.01 to 6. A

highly preferred iodine index is 0.03 to 6. Dehydrated potatoes which do not have iodine indices within the noted range can be made suitable for preferred use in the present invention by pulverizing or finely grinding at least a part of the dehydrated potatoes in a hammermill or other suitable grinding device, e.g., to a maximum size capable of passing through Number 50 U.S. series sieve. This ruptures some of the potato cells and thereby provides free starch which in turn increases the iodine index of the dehydrated potatoes. To determine the iodine index of a sample of dehydrated cooked potatoes, distilled water at room temperature is added to a quantity of the dehydrated potatoes and the mixture is gently stirred for about 30 minutes in a constant temperature bath at 50°C to completely wet the sample and hydrate the free starch. The sample is centrifuged for 10 minutes at a relative centrifugal force of about 1450 g (where g is the acceleration due to gravity) to separate the undissolved potato solids from the solution and the resulting clear starch solution is decanted through a glass wool plug to filter out any solids. The starch solution is then diluted to 10% of its initial concentration by adding distilled water. Equal volumes of diluted starch solution and a dilute KI_3 solution prepared in the manner described below are intimately intermixed to form a homogeneous solution. A separate solution comprising equal volumes of distilled water and the dilute KI_3 solution is similarly prepared and is used as a blank. The two solutions are then placed in a spectrophotometer, such as a Beckman Model B (Registered Trade Mark) with blue phototube or equivalent, and the absorbance of the homogeneous starch solution in relation to that of the blank solution is obtained at a wavelength of 610 millimicrons using cells of 1 cm. thickness. If the absorbance is greater than 0.5 or less that 0.05 the dilution of the starch solution is adjusted by adding either additional starch solution or additional distilled water to provide an absorbance between those values. The iodine index of the sample is calculated by dividing the absorbance value so obtained by the final concentration of the starch solution in terms of grams of initial dehydrated potato sample per liter of solution. A stock KI_3 solution is prepared by dissolving 3.8 grams of ACS grade KI and 2.54 grams of I_2 in one liter of distilled water. The stock KI_3 solution is then diluted for use by adding 475 milliliters of distilled water to 25 milliliters of the stock solution to form the dilute KI_3 solution.

Doughs based on the type of dehydrated potatoes specified immediately above can provide excellent fried products as disclosed in detail in co-pending application 36543/68 (Serial No. 1,195,138). Most preferably, the doughs utilized in the present invention are prepared by intimately admixing water with dehydrated cooked potatoes to form a coherent, workable dough comprising from 25 to 65% water by weight, said dehydrated cooked potatoes having a reducing sugar content of from 0 to 5% by weight and an iodine index of from 0.01 to 6, said dough having a lipid content defined by the following relationship: $Y=AX^{0.4}$, where Y is the lipid content of the dough in percent by weight of dehydrated potatoes, A has a value less than or equal to 2.70, and X is the dehydrated potato iodine index which ranges from 0.01 to 6. Although the flavour of the products which result from frying the doughs of the above-identified application is satisfactory, an improved flavour more akin to that which results when raw potato slices are fried is obtained when an ascorbic acid compound is added to the potatoes or incorporated in the dough prior to frying in accordance with the present invention.

The dehydrated cooked potatoes (hereinafter "dehydrated potatoes") used in the present invention can be either in flake, granular, or powdered form (potato flour). These dehydrated potato products are made by drying cooked mashed potatoes. The flakes can be made according to a number of known processes, including those described in U.S. Patents 2,759,832, 2,780,552 and 2,787,553. The granules can also be made according to known processes, including those described in U.S. Patents 2,490,431 and 2,520,891. Potato flour is made by drum drying cooked mashed potatoes to a thin sheet which is then ground to the desired fineness.

Dehydrated potato flakes typically have a moisture content of about 7% by weight and have their potato cells substantially intact with a minimum of free starch. In addition, various stabilizers and preservatives are usually employed to improve the stability and texture of the flakes. For example, from 150 to 200 parts per million (ppm) of sulphite is provided in the dry product. This is added to the wet mash usually as dry sodium sulphite and sodium bisulphite and protects the flakes from darkening during processing and subsequent storage. Antioxidants such as BHA (2 and 3 - *tert* - butyl - 4 - hydroxyanisole) and BHT (3,5 - di - *tert* - butyl - 4 - hydroxytoluene) are added in amounts up to a total of about 10 ppm to prevent oxidative deterioration. Citric acid is generally added in a quantity sufficient to give about 90 ppm in the dried product to prevent discolouration caused by the presence of ferrous ions. Monoglycerides such as glycerol monopalmitate or glycerol monostearate are also added to the wet mash prior to drying in amounts ranging from 0.4% to 1% by weight to improve the texture of the reconstituted mash.

Dehydrated potatoes in granular form have a moisture content of about 6% by weight and are composed of substantially unicellular potato particles which have their cell walls intact and which are capable of passing through a No. 60 to a No. 80 U.S. Series sieve. The granules also have sulphite added to reduce darkening, the amount of sulphite in the finished product usually comprising between about 200—400 ppm of sulphite in the form of sodium sulphite and sodium bisulphite. Antioxidants such as BHA and BHT are added in amounts not exceeding 10 ppm of both to prevent oxidative deterioration.

Potato flour is made by drying cooked mashed potatoes to a moisture level of about 6% by weight and grinding the dry product to a given particle size, generally from 70 to 180 microns. Unlike the dehydrated potato flakes and granules described above, however, potato flour is composed of substantially 100% ruptured potato cells.

Any of the above-described forms of dehydrated potatoes (i.e., flakes, granules, or flour), with or without the additives, can be used in carrying out this invention, especially if they meet the preferred free starch content requirement. Dehydrated potatoes having a reducing sugar content from 0 to about 5.0% by weight, preferably from 0.4 to 1.5% by weight, are preferred when making potato-chip type products to maintain the desired light colour in the fried chips since an excessive reducing sugar content adversely increases the rate of browning of the chip product. While the reducing sugar content is dependent upon that of the potatoes which were employed to prepare the dehydrated potato product, the amount of reducing sugar in the dehydrated product can be increased by adding suitable amounts of reducing sugars such as glucose, maltose or lactose.

Dehydrated potatoes prepared from high quality potatoes are preferred for use in this invention including Kennebec, Russet Burbank, Idaho Russet, and Sebago potatoes.

The lipid content of dehydrated potatoes is usually well below about 1% but it can be increased (when desired to improve the physical properties of a dough) to any level above about 1% by the addition of a suitable amount of fatty substances such as, for example, mono-, di-, and tri- glycerides of fatty acids, such as monopalmitin, monostearin, monoölein, dipalmitin, and tripalmitin, and partial fatty esters of glycols, such as propylene glycol monostearate and monobehenate. The lipid can be added to the dehydrated potatoes or it can be added to water. It is important, however, that the lipid be uniformly dispersed in whichever component it is mixed.

The total moisture content of the dough can range from 25 to 65% by weight (including the moisture content of the dehydrated potatoes), and is preferably from 35 to 45%, the balance of the dough comprising dehydrated potatoes (which have been rehydrated by the water).

In preparing the above-described doughs, the water added to rehydrate the dehydrated potato component of the mixture is preferably heated, but water which is at room temperature can also be used. The water and dehydrated potatoes are uniformly mixed in, for example, a vertical, planetary paddle mixer until the water is evenly dispersed throughout the dough and the potatoes have been uniformly rehydrated to the extent possible by the amount of water present. Heated water results in a dough which is easier to roll into thin sheets. Preferably, the dough is at a temperature of from 80 to 170°F before it is rolled into sheets.

After the dough is prepared it can be formed into suitable shapes which can be deep-fat fried to provide the potato products of the present invention. The sizes and shaped pieces of the products into which the dough can be formed are endlessly variable. Among the possible potato products which can be so prepared, and one in which the present invention has found particular utility, is potato chips. Thus, potato chips represent a preferred embodiment of the invention. A conventional potato chip made from a slice of raw potato can be very closely simulated by passing the dough prepared as described above between spaced mill rolls to form a sheet of dough ranging in thickness from 0.005 to 0.1 inch, and preferably from 0.007 to 0.02 inch. The dough sheet so formed can be cut into elliptical pieces having the aproximate size and shape of sliced potatoes and then fried in conventional chip-frying apparatus. Alternatively, apparatus such as that described in co-pending application No. 36542/68 (Serial No. 1,195,137) can be used to produce uniformly-shaped chips.

In order to provide chips which have a surface conformation and shape similar to conventional chips made by frying thin slices of raw potatoes, it is preferred that the frying be performed with the chips constrained between a pair of closely fitting, similarly configured moulds which have apertures to permit the hot frying fat to come into intimate contact with the dough. Patent application No. 36542/68 (Serial No. 1,195,137) describes one form of suitable moulds. Although the dough formulations herein described are particularly suited for preparing moulded chips (constrained during the frying operation), it is not necessary that the frying be performed with the dough in a constrained condition and satisfactory chips or other potato products can be produced by freely passing cut dough pieces through hot frying fat.

The frying operation can be carried out with the frying fat at a temperature of from 275 to 400°F but is preferably performed at a fat temperature of from 350 to 375°F for a time of from 5 to 110 seconds, preferably from 5 to 60 seconds, more preferably from 5 to 30 seconds. Any edible cooking oil or shortening is a suitable medium for frying. The principle factor which influences the frying time is the colour of the fried chip, which is primarily a function of the reducing sugar content of the dehydrated potatoes. Some of the other factors which affect chip colour are the thickness of the chip, the temperature of the frying oil, and the type of oil used.

Ascorbic acid, which is added to the potatoes to provide improved flavour according to the present invention, is an organic compound found in many food products, including potatoes, and is capable of being commercially synthesized by a series of reactions from D-glucose. Ascorbic acid is also sometimes referred to as L-ascorbic acid or as Vitamin C. The compound is soluble in water and is available commercially in granular or powdered form.

Other compounds closely related to ascorbic acid and sometimes referred to herein as "ascorbic acid compounds" are also effective in enhancing the flavour of fried products prepared from dehydrated potatoes and water when added to the potatoes prior to frying. These compounds are: D-ascorbic acid, otherwise known as erythorbic acid or iso-ascorbic acid; dehydro-L-ascorbic acid; dehydro-D-ascorbic acid; and edible, water soluble salts of ascorbic acid and the other above-named compounds, such as, for example, sodium D-ascorbate, otherwise known as sodium erythorbate, sodium ascorbate, otherwise known as sodium-L-ascorbate; and calcium L- and D-ascorbate. Each of the aforementioned compounds is edible and soluble in water and is available in the form of crystals, granules or powders. Erythorbic acid has the same empirical formula as ascorbic acid, i.e., $C_6H_8O_6$, and is an isomer of ascorbic acid. Dehydroascorbic acid has the empirical formula $C_6H_6O_6$, and is the oxidized form of ascorbic acid. Sodium ascorbate and sodium erythorbate, for example, each have the impirical formula $NaC_6H_7O_6$ and are the sodium salts, respectively, of ascorbic acid and erythorbic acid. Of the above compounds, ascorbic acid *per se* (L-ascorbic acid) is preferred. The sodium salt is the preferred salt. Except for the compounds specifically named herein, all references to an "ascorbic acid compound" will be understood to include L-ascorbic acid, D-ascorbic acid, dehydro-L-ascorbic acid, dehydro-D-ascorbic acid, and water soluble, edible salts of these compounds, and mixtures thereof.

The ascorbic acid compound can be added to the potatoes during the wet mash stage of the dehydration process. This follows the cooking step but precedes the drying or dehydration step. Similarly, the ascorbic acid compound can also be added at the time the dough is rehydrated. Preferably, however, the addition is at the latter point and is by means of a solution of the ascorbic acid. Preferred results in flavour improvement are obtained when the ascorbic acid compound is added in the form of a solution, as compared for example, to merely mixing dry ascorbic acid with dry potato flakes or granules. A convenient way of executing this preferred embodiment of the invention is to dissolve the ascorbic acid compound in the water of rehydration, i.e., the water used in preparing the dough.

The amount of ascorbic acid compound added to the potatoes should be from 0.02 to 1.5% by weight of the dough. Preferably, the amount of ascorbic acid compound added is from 0.05 to 0.7% by weight of the dough, most preferably 0.2 to 0.4%.

As mentioned above, the ascorbic acid compound is preferably added to the potatoes at the time the dehydrated potatoes are rehydrated to form a dough, the ascorbic acid compound having been first admixed with the water of rehydration so that it is dissolved therein. This solution is then admixed with the dehydrated potatoes to form the desired dough. The amount of ascorbic acid compound added to the water should correspond to the amount desired to be added to the potatoes based on the weight of dough as set forth above. Thus, when the dough contains from 25 to 65% water sufficient ascorbic acid compound should be dissolved in the water prior to making the dough to provide a solution containing from 0.08 to 2.3% by weight of the ascorbic acid compound.

It will be apparent to those skilled in the art that various other ingredients can be included in the dough prepared acording to the present invention. Emulsifiers, binders, colouring agents, preservatives and anti-oxidants, and other food additives can be added, as desired. For example, the other ingredients can include compounds found in commercially available dehydrated potato flakes, such as sodium sulphite or sodium bisulphite to minimize darkening, BHA and BHT to prevent oxidative deterioration, citric acid to prevent discolouration caused by the presence of ferrous ions, and mono- and diglycerides to improve texture. Glucose can optionally be added when the reducing sugar content of the dehydrated potatoes is below about 0.5%, to improve the colour of the fried chips.

The following examples of the invention, while not intended to be taken as limiting the scope therof, will serve to illustrate the compositions of, and the processes for making

fried potato products having improved flavour according to the present invention. Unless otherwise indicated in the Examples, all percentages are by weight,

The fried products which resulted from the practice of the invention according to the following Examples were taste tested by a panel of tasters who compared the products, and graded their flavour, and indicated their preference with respect to the products to which an ascorbic acid compound had been added as compared with the same product prepared in the same manner but without an added ascorbic acid compound. The flavour scale used ranges from grades of 1 to 10 and is as follows:

10 — very strong potato flavour
8 — strong potato flavour
6 — moderate potato flavour
4 — weak potato flavour
1 — no potato flavour

As a frame of reference, commercially available potato chips prepared by deep-fat frying slices of raw potatoes can have an average flavour grade of about 7 and can range in flavour grade from 4 to 8.

EXAMPLE I

297 grams of dehydrated cooked potato flakes having an average reducing sugar content of about 0.4% were pulverized in a hammermill to provide pulverized flakes with ruptured cells and with the particles having a maximum size capable of passing through a Number 50 U.S. series sieve. The pulverized flakes had an iodine index of about 2.5. The flakes contained 6.3% water, 0.25% lipid, and a total of about 0.2% of sodium acid pyrophosphate, sodium bisulphite, BHA, and BHT.

4.6 grams of lipid in the form of commercially available mono-, di-, and triglycerides were added to 197 grams of boiling water in a suitable vessel. The mono-, di-, and triglycerides were prepared by superglycerinating soybean oil to obtain a mixture of mono-, di-, and triglycerides comprising about 40% monoglycerides, about 40% diglycerides, and about 20% triglycerides, and having an iodine value of 65. The lipid was permitted to melt in the boiling water and 1.0 grams of L-ascorbic acid and 0.5 gram of glucose were added to the water, after which the mixture was agitated by hand stirring for about one minute to completely disperse the added materials. The water solution thus contained 0.49% ascorbic acid by weight. 2.26% lipid by weight, and 0.24% glucose by weight.

The above prepared flakes were intimately intermixed with the above-prepared water solution in a Hobart (Registered Trade Mark) Model C—100 vertical, planetary, paddle mixer by slowly adding the boiling water solution to the pulverized dehydrated potatoes to provide a dough having a total moisture content of 43.0%. The combination was intimately blended at a mixer speed of 60 rpm for 4 minutes to completely rehydrate the potatoes and form a workable dough. The total lipid content of the dough was 7.07% and the amount of L-ascorbic acid added to the potatoes was 0.20%, based on the total weight of the dough.

The dough was at a temperature of about 115°F and was passed between the rolls of the two-roll mill to provide a coherent, easy-to-handle dough sheet which had a thickness of 0.015 inch. The dough was immediately cut into substantially elliptical pieces which had a major diameter of about 3.0 inches and a minor diameter of about 2.0 inches. The pieces were then deep-fat fried for 14 seconds in a cotton-seed-based frying oil which was maintained at a temperature of 350°F. The resulting fried product was a tasty, crisp, chip-type food product which was then salted uniformly over one surface to provide a chip having 2% salt.

The taste, texture, colour, eating quality and appearance of the potato chip product prepared in this Example closely resembled that of conventional potato chips made by frying sliced raw potatoes. When compared by a panel of five people with a control product prepared as indicated above but without the addition of L-ascorbic acid, the chip prepared according to the invention with the added L-ascorbic acid had an average flavour grade of 6.5 while the average flavour grade of the control chip was 5.6. In terms of flavour preference, three of the panelists preferred the chip prepared according to the invention while two had no preference. None of the panelists preferred the control chip.

In further Examples, potato chips were prepared from the indicated dough compositions according to the process described in Example I but with the difference in components listed.

DOUGH COMPOSITION					FLAVOR EVALUATION				
					Flavor Grade		Flavor Preference		
% L-ascorbic acid added	% dehydrated potatoes	% water added	% lipid added	% glucose added	Chip containing added L-ascorbic acid	Control Chip (no L-ascorbic acid added)	Chip containing added L-ascorbic acid	Control Chip (no L-ascorbic acid added)	No Preference
0.05	61.3	38.4	0.30	0	6.8	6.1	8	2	0
0.025	61.2	38.3	0.50	0	6.4	6.2	4	2	0
0.70	61.0	38.0	0.26	0	6.8	5.9	4	0	0
0.10	59.5	39.4	0.92	0.1	6.0	5.6	3	2	0
0.40	59.2	39.4	0.92	0.1	6.8	5.6	5	0	0

EXAMPLE II

Example I was repeated using 309 grams of the dehydrated potatoes, 191 grams of boiling water, and 0.5 gram of dehydro-L-ascorbic acid. (The amount of dehydro-L-ascorbic acid added, based on the weight of the dough, was 0.10%). The resulting fried chips had a taste very similar to that of potato chips prepared by deep fat frying slices of raw potatoes. Out of three flavour panelists who tested these Examples chips along with control chips to which the dehydro-L-ascorbic acid had not been added, all preferred the flavour of the chips according to the invention containing added dehydro-L-ascorbic acid.

When D-ascorbic acid, sodium L-ascorbate, and sodium D-ascorbate were added instead of dehydro-L-ascorbic acid in Example II, and at a level of 0.2% of the dough by weight, substantially similar results were obtained in that the resulting potato chips resembled conventional potato chips in appearance, texture, and taste and were preferred over control chips by a majority of those who tasted samples with and without the added ascorbic acid compound.

EXAMPLE III

Potato chips were prepared according to the process of Example I and, in addition, a binder in the form of potato amylopectin was employed. The composition of the dough was as follows:

Dehydrated potato flakes	54.0%
Potato amylopectin	7.4
Added lipid	0.9
Added glucose	0.1
Water	37.4
Added L-ascorbic acid	0.2
Total	100.0%

The thin dough pieces were fried for 20 seconds at a temperature of 350°F. The resulting chips had an average flavour grade of 6.3, as opposed to the same chips without added L-ascorbic acid which had an average flavour grade of 5.7.

EXAMPLE IV

French fried potatoes were prepared from a dough based on dehydrated potatoes and water and consisting of the following ingredients:

Dehydrated potato flakes	30.1%
Water to partially rehydrate the flakes	63.2
Methylcellulose, 2% solution	2.0
L-ascorbic acid added	0.2
Non-fat milk solids	2.4
Egg white solids	0.3
Mono- and diglycerides	1.0
Salt	0.8
Total	100.0%

Strips approximately 3/8×3/8×3 inches were formed and fried for 110 seconds at a temperature of 350°F. The resulting French fried products were compared with the same products without added L-ascorbic acid and were preferred by eight out of ten panelists who tasted both products.

The foregoing Examples clearly demonstrate the effectiveness of an ascorbic acid compound in enhancing the flavour of fried potato products prepared from a dough of dehydrated potatoes and water when the ascorbic acid compound is added to the potatoes prior to frying.

The theory underlying the desirable flavour effect achieved by the process of the present invention is not clearly discernible. The flavour of the ascorbic acid compound is itself not at all potato-like, but in fact is a sharp acid-type flavour. Moreover, potatoes generally, and dehydrated potatoes specifically, are believed to contain ascorbic acid in limited quantity. Yet, adding an amount of ascorbic acid compound specified herein to the potatoes (which provides a level above and beyond that which might ordinarily be present) imparts a significant flavour improvement to the fried product. Therefore, it is believed that the added ascorbic acid compound undergoes chemical reaction with certain potato components, perhaps amino acids and sugars, under frying conditions, to give flavourful reaction products. This theory is supported by the fact that the added ascorbic compound does not improve the flavour when added directly to the end product. Further, the preferred flavour results obtained when a portion of the dehydrated potatoes have had their cells ruptured can be explained by the fact that the ascorbic acid compound interacts more readily during frying with ruptured potato cells. In any event, products having a flavour more nearly resembling that of fried raw-potato-based products, particularly in

terms of a characteristic fried potato chip flavour, are obtained by following the essential steps of the present invention, i.e., adding an ascorbic acid compound and then frying.

Although the primary purpose in adding an ascorbic acid compound in accordance with the present invention is to increase the fried potato chip flavour of the product, there are other advantages in the process. For example, addition of the ascorbic acid compound increases the tolerance of the product to raw potato quality, dehydrated potato quality, and potato reducing sugar content. More specifically, the dehydrated potatoes which have been heretofore employed to prepare doughs from which fried potato products were subsequently prepared were generally of a high quality so that the final product would have a desirable potato-like taste. This required either that the best potatoes be employed or that particular efforts be taken during the course of dehydration to assure the least damage to the potatoes and thereby not adversely affect the flavour. Each of these approaches increased the cost of such products since it narrowed the available range of potatoes which could be used. However, when ascorbic acid or one of its related compounds is added as hereinabove described, the resulting products have an improved potato-like flavour and therefore either lower quality potatoes can be used or less costly procedures can be employed in their dehydration.

Another factor which can affect the flavour of products prepared from dehydrated potatoes and water is the amount of reducing sugar present in the potatoes. The reducing sugars combine with the amino acids present in potatoes to cause the browning reactions which are so characteristic of fried potato products. The more reducing sugar present, the darker will be the colour for a given frying time and temperature. Thus, the amount of sugar present in the dehydrated potatoes also becomes a limiting factor affecting their suitability for use in fried potato products since the higher the reducing sugar content, the quicker the product will brown and therefore less time will be available for the characteristic fried flavours to develop. However, when one of the ascorbic acid compounds of the present invention is added, the flavour is improved to the extent that the product can be fried for a shorter period of time and therefore potatoes having a higher reducing sugar content can satisfactorily be employed. If potatoes having a low reducing sugar content are employed, the colour of the fried product will be very light. To provide chips having a darker colour, glucose can be added to increase the total reducing sugar content to the desired level for proper colour.

A further advantage of the invention is that the added ascorbic acid compound provides a preservative effect. For example, certain types of dehydrated potatoes, particularly those containing a high reducing sugar level, tend to brown unevenly during frying. The added ascorbic acid compound helps to preserve a lighter, more uniform colour.

We hereby disclaim any performance of the present invention in a manner contrary to the "Preservatives in Food Regulations, 1962."

Subject to the foregoing disclaimer, WHAT WE CLAIM IS:—

1. A process for preparing fried potato products from a dough of dehydrated potatoes and water which comprises:

a) adding to the potatoes from 0.02 to 1.5% by weight of the dough of L-ascorbic acid, dehydro-L-ascorbic acid, D-ascorbic acid, dehydro-D-ascorbic acid, or water soluble edible salts or mixtures thereof; and

b) frying the dough for 5 to 110 seconds in fat having a temperature of 275°F to 400°F.

2. A process according to claim 1 in which the water content of the dough is 25 to 65% by weight.

3. A process according to claim 2 in which the water content of the dough is 35 to 45% by weight.

4. A process according to any of claims 1 to 3 wherein the ascorbic acid compound (as hereinbefore defined) is added to the potatoes in a concentration of 0.05 to 0.7% by weight of the dough.

5. A process according to claim 4 in which the ascorbic acid compound is added to the potatoes in a concentration of 0.2 to 0.4% by weight of the dough.

6. A process according to any of the preceding claims in which L-ascorbic acid is used.

7. A process according to any of the preceding claims in which the reducing sugar content of the dehydrated potatoes is 0 to 5.0% by weight.

8. A process according to claim 7 in which the reducing sugar content is 0.4 to 1.5% by weight.

9. A process according to any of the preceding claims in which frying is carried out for 5 to 60 seconds.

10. A process according to claim 9 in which frying is carried out at a temperature of 350°F to 375°F.

11. A process according to claim 10 in which the frying is carried out for 5 to 30 seconds.

12. A process according to any of the preceding claims in which the potatoes have an iodine index of 0.01 to 6.

13. A process according to claim 12 in which the potatoes have an iodine index of 0.03 to 6.

14. A process according to any of the preceding claims in which the ascorbic acid compound is dissolved in water and the water

is then used to rehydrate the potatoes in preparing the dough.

15. A process according to any of the preceding claims in which the dehydrated potatoes have a portion of their cells ruptured.

16. A process according to any of the preceding claims in which the dough is formed into shaped pieces prior to frying.

17. A process according to any of the preceding claims in which the dough is passed through spaced rolls to form a sheet of dough 0.005 to 0.1 inches thick and the dough sheet formed is cut into elliptical pieces having the approximate size and shape of sliced potatoes.

18. A process of preparing fried potato products according to claim 1 substantially as described with reference to the Examples.

19. Fried potato products whenever produced by the process of any of claims 1 to 18.

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